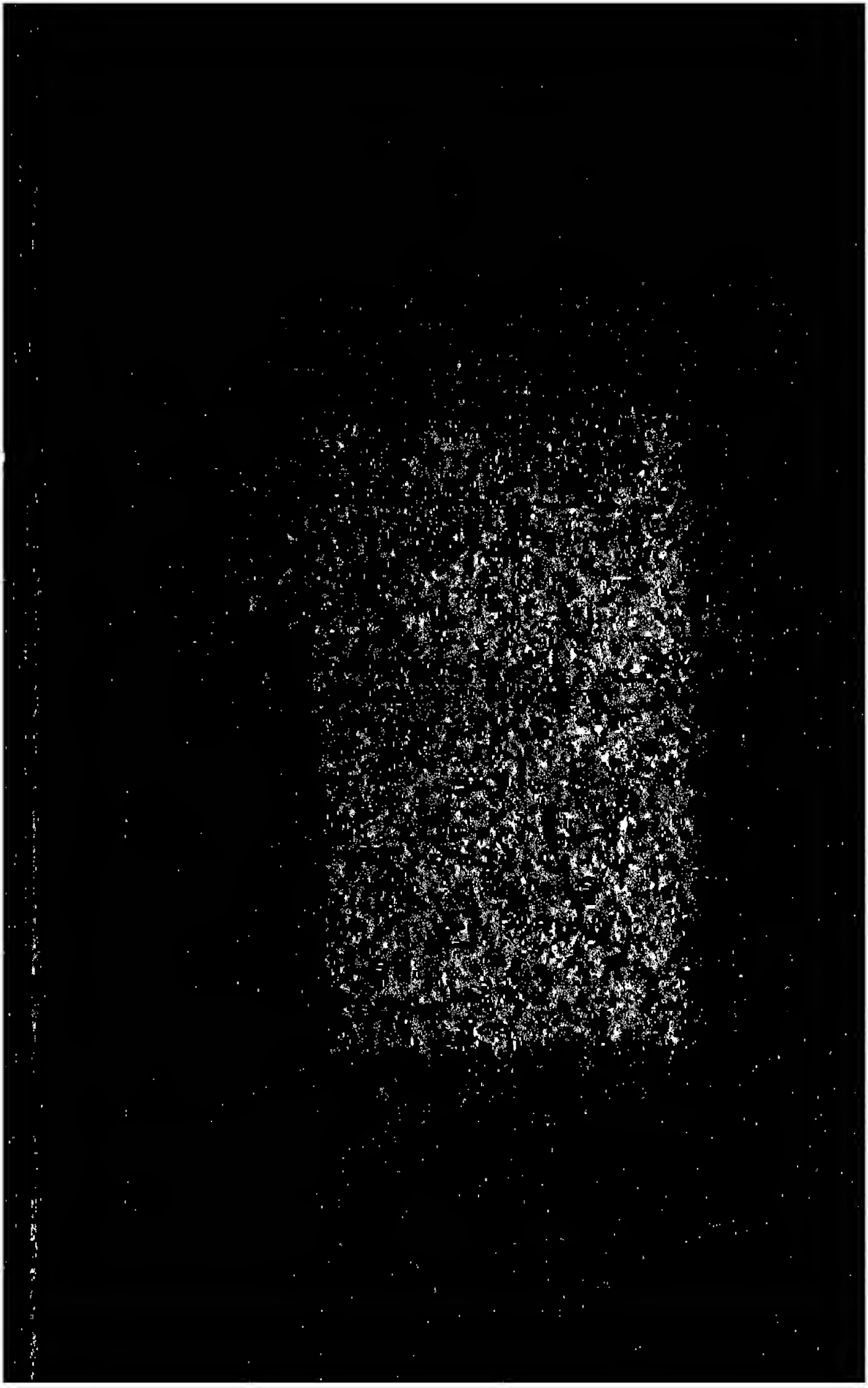

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THE PRAGMATIC ELEMENT IN KNOWLEDGE

BY

CLARENCE IRVING LEWIS

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CLARENCE IRVING LEWIS

There are three elements in knowledge; the given or immediate data of sense, the concept, and the act which interprets the one by means of the other. In the matrix of thought these are inseparable; they can only be distinguished by analysis. Not all would agree that even just analysis can separate them. In fact, theories of knowledge might be classified by their insistence upon one or another of these three and the attempt to comprehend the other two within it. Emphasis on the given or immediate, characterizes the mystic and Bergson's "pure perception." Subordination of the other two to the conceptual element, means idealism or some form of rationalism. Pragmatism is distinguished by the fact that it advances the act of interpretation, with its practical consequences, to first place.

If one ask for a rough and ready expression of the pragmatic creed, I suppose one will be likely to receive the answer, "The truth is made by mind." Qualification, of course, is needed at once. There is equal insistence that the making of truth is directed to some practical situation. And a practical situation implies brute fact, something given, as one element of it. The other element is a human being with his needs and interests. If the pragmatist emphasizes the importance of such needs in determining our human truth, it is equally just to remark that, without the brute fact of the given, the problem of meeting these needs would not arise. Nor would there be anything which could determine that one way of meeting them should succeed and another fail. If the pragmatist maintains, then, that the truth is made, at least he does not believe that it is made out of whole cloth.

Moreover, in conceiving that truth and knowledge represent active interpretation by the mind, pragmatism is not alone. Idealism likewise stresses the creativity of thought. Indeed, the idealist outruns the pragmatist in this respect, conceiving that the object, and so the situation to be met by knowing, has ultimately no existence independent of the mind.

The difference between the two—or a difference—lies in this; that for the idealist 'mind' means, in the last analysis, generic mind, the common human mind, or the ideal mind imperfectly manifest in us, the Absolute. While for the pragmatist minds are individual, ultimately distinct, and capable of idiosyncracy. Such personal or racial peculiarities, or differences which time makes in the prevailing temper, may find their expression in the way minds meet the situations which confront them. And so truth may be somewhat personal, and may change with history. It is not rooted in fixed categories which are a priori.

These are, then, the bare fundamentals of the pragmatist position concerning knowledge: that knowledge is an interpretation, instigated by need or interest and tested by its consequences in action, which individual minds put upon something confronting them or given to them. On any theory, it is to be expected that minds will largely coincide and that agreement, for various obvious reasons, will be the rule. But the extent and manner of such coincidence is, for pragmatism, something to be noted in particular cases, not simply the result of universal human reason.

As I have suggested, the validity of this general type of conception can be tested by studying the nature and importance in knowledge of the pragmatic element of interpretation, and its relation to the other two, which we may refer to as 'the concept' and 'the given' respectively.

Suppose that we take some outstanding example of knowledge, and, using it as a paradigm, attempt thus to assess the significance of interpretation. Whatever example we choose will be of some particular type, and we must be on our guard against mistaking as general features of knowledge what are

only typical of special cases. But if, from lack of time, we thus concentrate on a single illustration, it should represent knowledge at its best. For this reason, I propose the example of geometry. Mathematics comes very close to our ideal of knowledge at least in the important respect of relative certainty. And in the whole field of mathematics, geometry offers the best example because of the concreteness of its applications.

The last quarter-century of mathematical study represents the historical fruition of a great many previous researches and discoveries, so that today we can feel much surer that we understand the nature of mathematical knowledge than it ever has been possible for men to feel before. Three important results emerge from this study. The first is the discovery that all mathematics, and not geometry only, can be developed by the deductive method. A relatively few definitions and initial assumptions suffice to give us all the rest of any branch of mathematics, such as complex algebra or projective geometry.

The second of these results is a necessary consequence of the first: All mathematics is abstract in the sense of being independent of any and every possible application. Because if all the theorems follow logically from the definitions and postulates, then we can arbitrarily alter the things which we let the terms, such as 'point' and 'line,' mean, without in the least disturbing any step in the proofs. *Whatever* 'point' and 'line' may mean, given these assumptions about them, these consequences—the rest of the system—must also hold of them, because the theorems follow from the assumptions by pure logic. Thus for any mathematical system, there will be many possible applications, though very likely only one or two of these will have any practical importance. You can let 'points' mean the members of a set of clubs governed by certain rules, or you can let them represent what are usually described as "spheres one inch in diameter." Similarly, the a's and b's and x's of complex algebra may represent numerical magnitudes or you may let them represent the array of points in space. In this last case, both the applications mentioned are practically important.

The third step was the logical culmination indicated by the two preceding. It was discovered that we can dispense, in mathematics, with all the initial assumptions except the definitions. That is, all the truths of mathematics follow from the definitions of the terms used, without any further assumptions whatever except logic or the principles of proof. This third step could only be proved possible by actually carrying it out. The stupendous labor of thus developing the fundamental principles of mathematics merely from exact definitions of terms, by pure logic, was performed by Mr. Russell and Mr. Whitehead in *Principia Mathematica*.[1]

Our main interest in all this is that it definitely proves something that Plato ventured to assert two thousand years ago; that our knowledge of mathematics is quite independent of that sense-experience which suggests it to us and is the practical motive for our study of it. A club of thorough-paced mathematicians could retire from the world of sense, provided that were somehow possible, and not interrupt their discussions in the least. They would need a means of communication, of course, and some sort of counters, such as words or tally-marks, as the common currency of their discussion. But no application to sense-things is otherwise of the least importance to them. Often they do not assign any meaning at all to their *a*'s and *b*'s; the letters themselves are good enough symbols to serve all their interests.

Thus we discover that the content of pure mathematics is simply the deductive or logical order of purely logical entities, a sort of elaborate logical pattern of abstract terms without any denotation at all.

"But," you say, "who wants that kind of mathematics? Who cares whether it is possible or not?" I must not pause to answer that question in detail beyond pointing out the relation which the business of pure mathematics now bears to that of the practical man. The mathematician is a sort of maker of patterns. He keeps a stock of them which is already bigger than anybody has found a need for. He has an infinite number of

[1] Vol. 1 published in 1910.

different geometries, for example, all just as good from his point of view as Euclid, and such curiosities as quaternions and systems containing curves that have no tangents. Mostly he develops these from pure intellectual curiosity. He is exploring the Platonic heavens, and it may seem as important to him as measuring the earth. Sometimes the practical man borrows one of these patterns ready-made and finds for it a previously unsuspected application. Some of the most important advances in physical science have come about in just this way.

But our interest in this lies in the nature which the truth of abstract mathematics is revealed to have. Three points are important:

1. Assuming logic or common modes of valid proof, the truths of mathematics are quite independent of any world of sense, and hence independent of given experience, so far as given experience means perceptible sense-qualities. If there were two mathematical minds, one on the Earth and one on Mars, their experience and their sense-organs might differ in any way you can imagine, and still if only they shared a common logic or modes of valid thinking, all they would need would be some method of communication in order to have all the truths of mathematics in common.

2. In such abstract mathematics, the whole of all truth is open to any logical mind, provided we know precisely what the terms are defined to mean—that is, how they are logically related. To bring out the point, let us contrast mathematical and empirical or sense-knowledge from the point of view of learning. You see this desk. It is a thing of sense. Suppose that we carry away with us whatever knowledge we gain now as we look at it. And then suppose tomorrow someone ask, "Is there a knot on the under surface of the top of this desk?" We do not know. Not only that, but we might be the master minds of all the ages and have thought about it continuously during the interval, and still we could not know. Nothing but a further experience, of us or someone else, could possibly determine the question.

But now suppose that someone write down here the initial principles of some mathematical system—say Euclid's geometry. We may take *that* knowledge away with us, and there is absolutely no mathematical truth of that system which we could not learn merely by thinking about it.

3. An obvious point but for us the most important of all: Mathematical truth is a little more certain than almost any other knowledge that we have, precisely for the reason indicated above. We really do not need any further experience to verify it, and no further experience could possibly trip us up and prove us wrong, unless we have been illogical in our thinking. It is the kind of truth called a priori, knowable with certainty in advance of any particular sense-experience whatever.

Admittedly not all knowledge is of this sort. As soon as we raise practical questions about the application of geometry to space or of algebra to stresses and strains, the situation is quite different and more complex. But pure mathematics is, I think, typical of one element which enters into all knowledge. It is because we have here an almost clean separation of this element that I have chosen this example, which in other respects may be a little difficult and uninteresting.

Mathematics is an illustration of the immensely elaborate body of truth which may rise from pure concepts, from the merely logical relations of terms, and terms which need not have any reference to sense-qualities or experienceable things of any sort. Moreover, the initial meanings or relations of these terms are quite arbitrary. The mathematician makes them what he will. Often he chooses them from intellectual curiosity about their consequences, an interest very much like that in the possible moves in a game of chess. When such relations of a few terms are set up, just as when a few rules are imposed as conditions of the game of chess, the logical consequences to which they give rise are almost inexhaustible and absolutely determined.

Now in all our knowledge—particularly in all science—there is an element of just such logical order which rises from our

definitions. An initial definition, as we may see, is always arbitrary in the sense that it cannot be false. In itself it does not tell us whether anything is true or not, or what the nature of existing objects is. It simply exhibits to us a concept or meaning in the speaker's mind which he asks us temporarily to share with him and symbolize by a certain word or phrase. Socially, of course, it is important that such meanings should be common, and that words be used in familiar ways. But if a scientist finds a new concept worth developing, he may invent a technical term or use an old word in a new meaning which he takes care to make clear. That the introduction of concepts which are novel and not generally shared may be of the highest importance, is something illustrated by almost every major advance in science. Such an initial concept, whether new or old, is a definite logical structure. It sets up precise relations of certain elements of thought. And that structure—or the combination of a few such conceptual structures—may give rise to logical consequences as elaborate as mathematics or the game of chess.

Indeed, before we set out upon any systematic investigation, we must have such initial concepts in our minds. It does not matter how we get them; we can always change them for any reason, or for no reason if it suits our whim. The *real* reasons why we *do* use certain concepts is, of course, practical. That is another story, which I shall come to. But however we come by such initial meanings, it is obvious that we must have them before we address ourselves to any problem. Until we have principles of classification which serve to distinguish what is material from what is immaterial, what is a force from what is not a force, straight from crooked, rigid from non-rigid, the simultaneous from the successive, and so on—that is, until we have certain definite concepts or meanings in mind, we cannot even approach the problem of acquiring knowledge of any sort of things to which such concepts might apply. We have no handle to take hold of them by.

And whatever our concepts or meanings may be, there is a truth about them just as absolute and just as definite and certain as in the case of mathematics. In other fields we so seldom try to think in the abstract, or by pure logic, that we do not notice this. But obviously it is just as true. Wherever there is any set of interrelated concepts, there, quite apart from all questions of application or the things we use them of, we have generated a whole complex array of orderly relations or patterns of meaning. And there must be a truth about these—a purely logical truth, *in abstracto*, and a truth which is certain apart from experience—even though this is only a part of the truth which we want to discover, and the rest of it is of a quite different sort which depends upon experience.

Ordinarily we do not separate out this a priori truth, because ordinarily we do not distinguish the purely logical significance of concepts from the application of words to sensible things. In fact it is only the mathematician who is likely to do this at all. But I should like to indicate that this separation is always possible and that it is important for the understanding of knowledge. To this end, let me use the term 'concept' for this element of purely logical meaning. We can then discriminate the conceptual element in thought as the element which two minds must have in common—not merely may have or do have but absolutely *must* have in common—when they understand each other.

I suppose it is a frequent assumption that we are able to apprehend one another's meanings because our images and sensations are alike. But a little thought will show that this assumption is very dubious.

Suppose we talk of physical things in physical terms, and our discussion involves physical measurement. Presumably we have the same ideas of feet and pounds and seconds. If not, the thing is hopeless. But in psychological terms, my notion of a foot goes back to some immediate image of visual so-long-ness, or the movements which I make when I put my hands so far apart, or to a relation between these two. Distances in general

mean quite complex relationships between such visual perceptions, muscle and contact-sensations, the feeling of fatigue, and so on. Weight goes back to the muscle-sensation which we call in New England the "heft" of the thing. And our direct apprehension of time is that feeling of duration which is so familiar but so difficult to describe.

Now in such terms, will your sensory image of a foot or a pound coincide with mine? I am nearsighted; your eyes are good. Or I might have a peculiarity of the eye muscles so that focusing on near objects would be accompanied by a noticeable feeling of effort, while this is not the case with you. When it comes to reaching, there is the difference in the length of our arms. If we lift a weight, there is the difference in strength between us to take into account. So it is with everything. In acuity of perception and power to discriminate, there is almost always some small difference between the senses of two individuals, and frequently these discrepancies are marked. It is only in rough and ready terms that we can reasonably suppose that our direct perceptions are alike.

Even for the large and crude distinctions, what assurance is there that our impressions coincide? No one can look directly into another's mind. The immediate feeling of red or rough can never be transferred from one mind to another. Suppose it should be a fact that I get the sensation you signalize by saying "red" whenever I look at what you call "violet," and vice versa. Suppose that in the matter of the immediately apprehended qualia of sensation my whole spectrum should be exactly the reverse of yours. Suppose even that what are for you sensations of pitch, mediated by the ear, were identical with my feelings of color-quality, mediated by the eye. How should we ever find it out? We could never discover such peculiarities of mine so long as they did not impair my powers to discriminate and relate as others do.

Psychological differences of individuals are indeed impressive. Long before scientific psychology was thought of, the ancient skeptic had based his argument on them. This is what

led Gorgias to say that nothing can be known, and if anything could be known, it could not be communicated. There can be no verification of community between minds so far as it is a question of the feeling side of experience, though the assumption that there is no coincidence here seems fantastic.

Yet Gorgias was quite wrong about the communication of ideas. That your sensations are never quite like mine, need in no way impede our common knowledge or the conveying of ideas. Why? Because we shall still agree that there are three feet to the yard, that red is the first band in the spectrum, and that middle C means a vibration of 256 per second. At the end of an hour which feels very long to you and short to me, we can meet by agreement, because our common understanding of that hour is not a feeling of tedium or vivacity, but means sixty minutes, one round of the clock, a pattern of relation which we have established between chronometers and distances and rates of movement, and so forth.

When we want to be sure that we share each other's meanings, we define our terms. Now defining terms makes no direct reference to sense-qualities. We set up logical relations of one term to others. The pictures in the dictionary may help, but they are not necessary. We might suppose that such definition chases one meaning back into other meanings, and these into still others, until finally it is brought to bay in some first (or last) identity of meaning which must be identity of sensation or imagery. But all the words used in defining any term in the dictionary are also themselves defined. There is no set of undefined first terms printed at the beginning. The patterns of logical relationships set up by these interconnected definitions of terms, themselves constitute the conceptual meanings of the terms defined.

To sum up this matter: The sharing of ideas does not necessarily depend on any identity of sense-feeling. It requires only a certain fundamental agreement in the way our minds work. Given this basis of logic, the process of coming to possess our meanings—and in that sense, our world—in common, is secured

by the business of living together and the methods of naming, pointing, and learning by imitation, which exhibit the fundamental habits of the social animal. In the end, the practical criterion of common meaning is congruous behavior. Speech is merely that part of behavior which is most significant for securing the cooperation of others.

But while I have been striving to make it plausible that concepts and common meanings are something apart from immediate sensation, you have been preparing an objection, I am sure. "This concept," you will say, "is a mere abstraction. Nobody has one in his mind without connecting it with his experience of objects; and the principal use of concepts is to apply to and name perceivable things."

I must grant this at once. Indeed it is one of the points I should like to make. The purely logical pattern of meaning is always an abstraction. It is exactly like the concepts of pure mathematics in this respect, though other concepts may often lack the simplicity and exactness of the mathematical. Just as in the case of pure mathematics there is a complex and important set of logical consequences which arise merely from the definitions of terms, so also in the case of concepts in general, the pattern of logical relations which is generated simply through our modes of distinguishing and relating, is something intrinsically capable of being separated from all application to things of sense, and would then constitute a definite and considerable body of knowledge which could be learned merely by thinking, without any reference to the external world at all. Indeed we know at once that any sort of definition has logical consequences which can be so learned. When we remember that any science, and even common-sense knowledge, can get under way only through our bringing to experience those initial modes of classification and relation which our definitions embody, we are brought to realize that in physics, or chemistry, or any other department of knowledge, we do not study simply the facts of our given experience. We study in part such facts and in

part the consequences of our own logical meanings, though usually without any separation of these two.

In our knowledge of the external world, concepts represent what thought itself brings to experience. The other element is 'the given.' It represents that part or aspect which is not affected by thought, the "buzzing, blooming confusion," as James called it, on which the infant first opens his eyes.

It is difficult to make a clean separation of what is given in experience from all admixture of conceptual thinking. The given is something less than perception, since perception already involves analysis and relation in recognition. One cannot express the given in language, because language implies concepts, and because the given is just that element which cannot be conveyed from one mind to another, as the qualia of color can never be conveyed to the man born blind. But one can, so to speak, point to the given. There are some of us who enjoy music passively. We just soak it in, as the infant may confront the world in his first conscious perception. We are transported by it, and all thought is put to sleep. Perhaps others tell us that this is a very uncultivated attitude; that we do not hear the music at all but only a glorious noise. What they mean is that we do not analyze our music and identify its pattern of harmony and melody. Well, for us who listen thus passively, music is pure given; while for those who intellectualize it by analysis it may be something more. But that *more* is not given; the mind brings it to the experience. In every experience there is such a given element, though in very few does it have such immediate esthetic character that we are content to remain confronting it without adding to it by thought.

Perhaps you see already that the mere immediacy of such given experience is never what we mean by knowledge. Or rather, I ought to say, it is not what *most* of us mean by knowledge. There are some, as for instance Bergson and the mystics, who reserve the term 'knowledge' for precisely such a state of luminous immediacy. In the end, it is fruitless to quarrel about the use of terms; we can only note this curious exception to

ordinary parlance, and pass on. For the rest of us, knowledge of things does not mean being sunk in such immediacy, but an attitude in which what is given is interpreted and has some significance for action.

If I bite an apple, what is given is an ineffable taste. But if this is the basis of any knowledge, it is because I interpret this taste as significant of what is not just now given, of the quality of the apple or of another bite. At this moment, your immediate apprehension of this thing which I hold in my hand leads you to say that I have here a sheet of paper. But if this should suddenly explode, or if I should proceed to swallow it and smile, you might revise that judgment and realize that it went quite beyond what was absolutely given in perception. Or we might just now hear a chirring, chugging noise which would lead us to think of an automobile outside. But in that case, we are at once aware how very much we have added to the given by way of interpretation.

If time permitted, I should like to make it clear that a state of pure immediacy in which consciousness would just coincide with the given, would always be purely passive, and that thought not only is active interpretation but that such interpretation is always significant of our possible action and of the further experience to which such action would lead. But I can omit this, because it is a thought which William James himself made familiar. At least it will be clear that in the knowledge of objects, as much as in the knowledge of propositions or generalizations, this element of active interpretation must always be present. We do not have any knowledge merely by being confronted with the given. Without interpretation we should remain forever in the buzzing, blooming confusion of the infant. This, I suppose, is the biological significance of thinking. It is an activity by which we adjust ourselves to those aspects of the environment which are *not* immediately apprehended in sensation. Knowledge is always something which can be verified. And in verification we always proceed to something which is not just now presented.

It is upon the manner and the nature of this interpretation which we put upon the given that I should like to concentrate our attention. Clearly it is something which we bring to the experience. It is something we are able to make only because we confront what is presented by the senses with certain ready-made distinctions, relations, and ways of classifying. In particular, we impose upon experience certain patterns of temporal relationships, a certain order, which makes one item significant of others. A visually presented quale of the object is a sign of the way it would taste or feel. The taste of it *now* is a sign of the taste of the next bite also. The way yonder door looks to me now is a sign of the distance I must walk to reach it and the position in which I must put my hand to open it. It is by interpretation that the infant's buzzing, blooming confusion gives way to an orderly world of things. Order, or logical pattern, is the essence of understanding. Knowledge arises when some conceptual pattern of relationships is imposed upon the given by interpretation.

Moreover, as we have seen, it is only this conceptual element of order or logical pattern which can be conveyed from one mind to another. All expressible truth about our world is contained in such relations of order, that is, in terms of concepts we find applicable to what is presented in sense.

Now the concepts which we thus impose upon given experience are almost always such as we have formulated only as the need for them arose. Experience itself has instigated our attitudes of interpretation. The secret of them lies in purpose or interest. It is because our concepts have so generally this pragmatic origin that I began with the one illustration where the case is clearly different. Though elementary mathematics is historically rooted in practical need, mathematical concepts have some of them a quite different origin. The mathematician has a whole cupboardful of such conceptual systems for which nobody has found as yet any useful application. *All* concepts have intrinsically the possibility of such separate status; and all truth or knowledge represents an order which is capable

of being considered, like mathematical systems, *in abstracto*. The business of learning, and the process by which mind has conquered the world in the name of intelligibility, is not a process in which we have passively absorbed something which experience has presented to us. It is much more truly a process of trial and error in which we have attempted to impose upon experience one interpretation or conceptual pattern after another and, guided by our practical success or failure, have settled down to that mode of construing it which accords best with our purposes and interests of action.

Moreover, this mode of successful interpretation may not be dictated unambiguously by the content of experience itself. The famous illustration of this fact that William James made use of is probably the best. For a thousand years men interpreted the motions of the heavens in terms of Ptolemy's astronomy, based on a motionless earth. Then gradually this was given up in favor of the Copernican system of moving earth and fixed stars. Those who argued this issue supposed they were discussing a question of empirical fact. We now perceive that such is not the case. All motion is relative. The question what moves and what is motionless in the heavens is one which cannot be settled merely by experience. But one choice of axes is highly convenient, resulting in relatively simple generalizations for the celestial motions and enabling celestial and sublunary phenomena to be reduced to the same equations, while almost insurmountable complexity and difficulty attend the other choice. Theoretically if any system of motions is describable with respect to one set of axes, it is also describable in terms of any other set which moves with reference to the first according to any general rule. So that the issue between the Ptolemic and Copernican choice of a frame of motion cannot be decided on the ground that one describes the facts, the other not. Rather the one describes the facts simply and conveniently, the other complexly and most inconveniently. The only issue is pragmatic.

Similarly with the recent controversy between the physics of relativity and the Euclidean-Newtonian mechanics. Perhaps you and I—certainly I—do not understand the intricacies of Einstein, but so much we have gathered: That since all motion is relative, and since, further, whatever happens at some distant point is known to us only by the passage of an effect through space and time, we cannot measure space without some assumption about time, or time without assumptions about space and the laws of matter which govern clocks, and so on. Therefore at the bottom of our interpretation of events in the physical universe there must be some fundamental assumptions, or definitions and criteria, to which empirical evidence cannot simply say yes or no. One set of assumptions—the relativity ones—means a reduction in the number of independent laws but a reorganization of common-sense; the other set obviates this change in current notions about space and time but condemns us to forego the simplification in fundamental principles. The determinable empirical issues, such as the perturbations of Mercury and the bending of light rays, are—so we may venture to think—by themselves not decisive. If there were no other issue, we should find some way to accommodate these recalcitrant facts to the old categories. The really final issues are pragmatic ones such as the comprehensiveness of laws and economy in unverifiable assumption.

From such striking and important illustrations to the humbler affairs of every day, is a far cry. And time does not permit the introduction of further examples which might bridge the gap. But does not history go to prove the point? In any given period, there is some body of generally accepted concepts in terms of which men describe and interpret their experience. Later, these may all be strange. If we go back to the Middle Ages or to the civilization of ancient Greece, and try to view the world as men then saw it, only by an effort can we do so. We might expect that the fundamental things—life, mind, matter and force, cause and effect—would be conceived in

the same way. Yet it is exactly here that we find the greatest differences.

These facts are familiar to you, and I need not dwell upon them. But perhaps I may pause for a single illustration. Among the ancients, the distinction between the living and the inanimate was generally drawn between those things which were supposed to have a soul which was the cause of their behavior and development, and those which had no such internal principle which explained their movements. 'Soul' was thus a synonym for 'the vital,' and was a principle of nature, coordinate with the mechanical. Why was this principle of distinction later given up? Has it been disproved that all living things have souls? Or that we must grant, in addition to the mechanical causes of the phenomena of life, an internal vital principle which explains development? We can hardly claim so much. Really to explain this change of categories, we must probably reckon, on the one side, with Christianity and similar influences which, when they came, contrasted 'soul,' as the spiritual principle in man, with the material body. Thus the soul, instead of being conceived as a natural cause of vital phenomena, is now withdrawn from all physical significance. On the other side, the advantage of control which goes with understanding the facts of life, so far as possible, in terms of physics and chemistry, has operated to extrude the idea of a soul, as a natural inner principle, from any place in biological conceptions.

With other fundamental concepts, it is much the same. *Words* such as 'life,' 'matter,' 'cause,' and so on, have been used since thought began, but the *meanings* of them have continuously altered. There is hardly a category or principle of explanation which survives from Aristotle or the science of the Middle Ages. Quite literally, men of those days lived in a different world because their instruments of intellectual interpretation were so different. To be sure, the telescope and microscope and the scientific laboratory have played an important part. As time goes on, the body of familiar experience widens. But that hardly accounts for *all* the changed interpre-

tation which history reveals. Not sense observation alone, but accord with human bent and need, must be considered. The motive to control external nature and direct our own destiny, was always there. Old principles have been abandoned not only when they disagreed with newly-discovered fact, but when they proved unnecessarily complex and bungling, or when they failed to emphasize distinctions which men felt to be important.

When things so fundamental as the categories of space and time, the laws of celestial mechanics, and the principles of physics, are discovered to depend in part upon pragmatic choice; when history reveals continuous alteration in our basic concepts, and an alteration which keeps step with changing interests; and when we recognize that without interpretation it is not a world at all that is presented to us, but only, so to speak, the raw material of a world; then may it not plausibly be urged that, throughout the realm of fact, what is flatly given in experience does not completely determine truth—does not unambiguously fix the conceptual interpretation which shall portray it?

In short, if human knowledge at its best, in the applications of mathematics and in the well developed sciences, is typical of knowledge in general, then the picture we must frame of it is this: that there is in it an element of conceptual interpretation, theoretically always separable from any application to experience and capable of being studied in abstraction. When so isolated, concepts are like the Platonic ideas, purely logical entities constituted by the pattern of their systematic relations. There is another element, the sensuous or given, likewise always separable by abstraction, though we should find it pure only in a mind which did not think but only felt. This given element, or stream of sensation, is what sets the problem of interpretation, when we approach it with our interests of action. The function of thought is to mediate between such interests and the given. Knowledge arises when we can frame the data of sense in a set of concepts which serve as guides for action, just as knowledge of space arises when we can fit a geometrical interpretation upon our direct perception of the spatial. The given experience does

not produce the concepts in our minds. If it did, knowledge would be pure feeling, and thought would be superfluous. Nor do the concepts evoke the experience which fits them, or limit it to their pattern. Rather the growth of knowledge is a process of trial and error, in which we frame the content of the given now in one set of concepts, now in another, and are governed in our final decision by our relative success—by the degree to which our most vital needs and interests are satisfied.

If this is a true picture, then there are three elements in knowledge, or three phases of the relation of mind to the objects of thought. First, there is the kind of knowledge which we have in abstract mathematics, and the kind of truth which concerns purely logical implications. There is this type of truth for all concepts so far as they are precise and clear. Our knowledge of such truth possesses certainty and finality because it requires only clarity of thought and is entirely independent of experience.

This kind of truth can be, and has been, described in two ways, either of which is accurate when we grasp what they mean. First is the way of Plato, who emphasizes the fact that abstract concepts ("ideas" he calls them) are not created by the mind. What he means is that the mathematician, for example, does not create but discovers the truths that he portrays. Before the non-Euclidean geometries or the possibility of curves without tangents was even thought of, the truth about them was forever fixed.

The second way of describing this realm of abstract entities is to note that such pure concepts have no residence outside the mind. Plato's heaven—so we should say from this second point of view—is merely a fiction to emphasize the absoluteness of conceptual truth. Without our thought concepts would remain forever in the dark limbo of nothingness. Moreover, it is their usefulness, their applicability to given experience, which moves us to evoke them. We select, or call down from Plato's heaven, those concepts which meet our needs. Plato said we are "reminded" of them by experience; we are more likely to say that we invent or formulate them ourselves. In either case, two

points are to be remarked; first, that the logical relations of—and hence the truth about—any determinate concept is fixed and eternal and independent of experience. Second, that *what* concepts we shall use or apply, we are left to determine ourselves in the light of our needs and interests.

The second phase of the mind's relation to its objects, is the element of the purely given in experience. Of this by itself, there is no truth or knowledge in the ordinary sense. Yet the given has significance. There is something which speaks directly to us in just this presentation of the senses, in that immediacy of color or of sound which one who lacked the appropriate sense-organ could never imagine nor our description conjure up for him. In particular, the immediate has esthetic significance; perhaps it may also have ethical value and religious meaning. But it is not knowledge in the usual meaning of that term, because it is ineffable; because there is nothing in such direct apprehension which calls for verification; because by itself it has no reference to action.

The third element or phase—the element which distinguishes our knowledge of the external world—is the active interpretation which unites the concept and the given. It is such interpretation alone which needs to be verified, or *can* be verified, and the function of it is essentially practical. Truth here is not fixed, because interpretation is not fixed, but is left for trial and error to determine. The criteria of its success are accommodation to our bent and service of our interests. More adequate or simpler interpretation will mean practically truer. Old truth will pass away when old concepts are abandoned. New truth arises when new interpretations are adopted. Attempted modes of understanding may, of course, completely fail and prove flatly false. But where there is more than one interpretation which can frame the given, 'truer' will mean only 'better.' And after all, even flat falsity can only mean a practical breakdown which has proved complete.

At just this point, however, we may easily fall into misapprehension. In speaking thus of 'new truth' and 'old truth'

and of pragmatically 'truer' and 'falser,' I am following a usage which the literature of pragmatism has made familiar. But I think this is a little to be regretted. Most of the paradoxes and many of the difficulties of the pragmatic point of view cluster about this notion that the truth can change. When we see precisely what it is that happens when old modes of interpretation are discarded in favor of new and more successful ones, all these paradoxes will, I think, be found to disappear. What is it that is new in such a case? The given, brute-fact experience which sets the problem of interpretation is not new. And the concepts in terms of which the interpretation, whether old or new, is phrased are—remembering Plato—such that the truth about them is eternal. Obviously what is new is the *application* of the concept, or system of concepts, to experience of just this sort. The concepts are *newly chosen* for interpretation of the given data. That the concepts may also be new in the sense that no one ever thought of them before, does not, at bottom, affect the problem at all.

Historically the situation is likely to be slightly more complex; the body of data to be interpreted itself undergoes some alteration. It is possible that old systems of thought should be rejected and replaced by new, simply through reflection and realization of the superior convenience of the novel mode. In fact, this has sometimes happened. But in the more typical case, such change does not take place without the added spur of newly discovered phenomena which complicate the problem of interpretation. The several factors which must be considered are, then: (1) the two sets of concepts, old and new, (2) the expanding bounds of experience in which what is novel has come to light, (3) the conditions of application of the concepts to this new body of total relevant experience.

In the case of the Copernican revolution, it was the invention of the telescope and the increasing accuracy of observation which mainly provided the impetus to reinterpretation. But these new data, though practically decisive, were decisive of simplicity and comprehensiveness only. As we have seen, celes-

tial motions are theoretically as capable of interpretation with respect to axes through the earth as by reference to the fixed stars. Now suppose that mathematicians and astronomers had so much spare time that both these systems had been worked out, for all the data, with some completeness. Which would be the truth about the heavens? Obviously, both. The laws of celestial motion in the two cases would be quite different, and the divergence would extend beyond astronomy to physics. But both would be absolutely and eternally true in their own terms. The one would be better truth, the other worse, from the point of view of workability. But except in the practical sense that we must stick to the one or the other all through and cannot apply them piecemeal, they could not contradict one another.

This situation is not altered by any thought that newly discovered fact may play another than the pragmatic rôle, and be decisive of truth in a deeper sense. In any case, if old principles were ever true, they must remain true—in terms of the old concepts. To the extent that new evidence can render the old concepts absolutely inapplicable, the "old truth" never was anything but an hypothesis, and is now proved flatly false. It is not, I hope, the point of the pragmatic theory of knowledge to reduce all truth thus to hypothesis. That would be nothing but a cheerful form of skepticism.

Rather the point is—at least the point which I should like to make—that the truths of experience must always be relative to our chosen conceptual systems in terms of which they are expressed; and that amongst such conceptual systems there may be choice in application. Such choice will be determined, consciously or unconsciously, on pragmatic grounds. New facts may cause a shifting of such grounds. When this happens, nothing literally becomes false, and nothing becomes true which was not always true. An old intellectual instrument has been given up. Old concepts lapse and new ones take their place.

It would be a hardy soul who should read the history of science and of common-sense ideas and deny that just this shift of concepts on pragmatic grounds has frequently had important

place in the advance of thought. That historically men suppose they are confronted simply with a question of absolute truth when they debate Copernican versus Ptolemaic astronomy, mechanism versus vitalism, relativity versus Newtonian mechanics, and so on, does not remove the possibility that the really decisive issues may often be pragmatic.

Pragmatists have sometimes neglected to draw the distinction between the concept and immediacy, between interpretation and the given, with the result that they may seem to put all truth at once at the mercy of brute-fact experience and within the power of human choice or in a relation of dependence upon human need. But this would be an attempt to have it both ways. The sense in which facts are brute and given cannot be the sense in which the truth about them is alterable to human decision. The separation of the factors is essential. On the one side, we have the abstract concepts themselves, with their logical implications. The truth about these is absolute, and knowledge of them is a priori. On the other side, there is the absolute datum of the given. But it is between these two, in the determination of those concepts which the mind brings to experience as the instruments of its interpretation, that a large part of the problem of fixing the truths of science and our common-sense knowledge has its place. Wherever such criteria as comprehensiveness and simplicity, or serviceability for the control of nature, or conformity to human bent and human ways of acting, play their part in the determination of such conceptual instruments, there is a pragmatic element in knowledge.